

## REMARKS

Reconsideration of the application is respectfully requested for the following reasons:

1. Amendments to Claims

Claim 3 has been amended to delete the “as good as possible” phrasing objected-to on page 2 of the final Office Action.

It is respectfully submitted that this amendment is formal in nature and does not affect the scope of the claims. As a result, the amendment should not raise any **new issues**. In addition, the amendment is **necessary** to overcome the rejection under 35 USC §112, 2<sup>nd</sup> Paragraph, and **could not have been earlier presented** since the objection was made for the first time in the final Office Action (even though the objected-to language is also found in the original claims). Finally, it is respectfully submitted that the amendment materially reduces the number of issues for appeal by overcoming the rejection under 35 USC §112, 2<sup>nd</sup> Paragraph.

For the foregoing reasons, entry and consideration of the amendment under 37 CFR §1.116 is respectfully requested.

2. Rejection of Claims 3 and 4 Under 35 USC §112, 2<sup>nd</sup> Paragraph

This rejection has been overcome, as indicated above, by deleting the “as good as possible” phrasing.

3. Rejection of Claims 1 and 2 Under 35 USC §102(b) in view of U.S. Patent No. 5,786,737 (Goto)

This rejection is respectfully traversed on the grounds that the Goto patent fails to disclose or suggest a millimeter-wave passive FET switch having an impedance **transformation** network series-connected to the drain and source of an FET, as claimed. Instead, the impedance

**matching** circuit of Goto itself includes impedances 3a-3c and FET switches 4a-4c, as indicated in the following drawing:

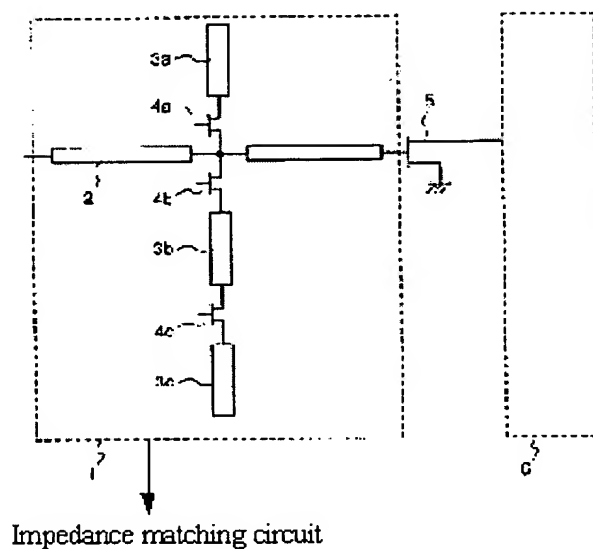


Fig. 1. (The Fig. 1 in U.S. Patent 5786737)

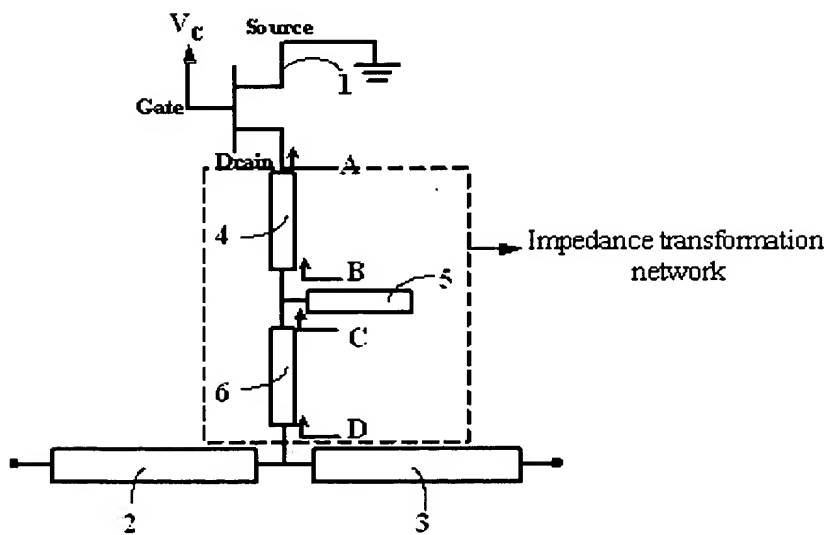


Fig. 2.

It is respectfully submitted that since FETs 4a-4b of Goto function solely as switches to connect selected impedances to the main line so as to **match** the impedance of FET 5, Goto does not disclose an impedance **transformation** network, as claimed.

As explained in col. 2, lines 34-44 of the Goto patent:

*According to a first aspect of the present invention, an impedance matching circuit comprises a matching substrate having a surface; a main line disposed on the surface of the matching substrate; a plurality of passive circuit having a plurality of stubs and FETs alternately connected in series the passive circuits changing impedance of the main line by electrical connection to the main line; a plurality of switching FETs connected in series between the main line and the respective passive circuits, **the switching FETs being on and off controlled in accordance with characteristics of an element to be evaluated.***

Although the structure of the impedance matching circuit of Goto is similar to that of the claimed passive FET switch, the function of the FETs is substantially different. The purpose of the claimed impedance **transformation** network is to compensate for the non-ideal switching characteristics of the passive FET (or HEMT) in the millimeter-wave frequency range (understood by those skilled in the art to be above 30 GHz), by adding an impedance transformation network between the FET and a signal line. In contrast, the purpose of the impedance **matching** network of Goto is to provide an electrically tunable impedance matching network to enable the impedance of a test element 5 to be determined. The impedance matching network of Goto is connected in such a way that it compensates for non-ideal switching characteristics of an FET, but rather is connected to vary the impedance of the network as a whole so as to match the impedance of element 5.

The impedance **transformation** network of the present invention transforms nonideal open and short circuits of the passive FET into near short and near open circuits. Thus, it in fact performs an impedance **transformation** function as claimed. The impedance **matching** circuit of Goto, on the other hand, includes impedance elements that are simply switched into or out of

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the test circuit, thereby varying the impedance to match that of the FET being tested. These differences are summarized in the following table:

	Ours	U.S. Patent 5786737	Comments
Purpose	To improve the performance of switches in MMW frequency range	To achieve tunable impedance using FET switches in low microwave frequency range	Ours: The switch is the object whose character needs to be improved; the ITN is used as the matching circuit for the switch to improve its character U.S. Patent 5786737: The matching circuit is the object whose impedance needs to be tunable; the FET switch is used in the matching circuit to achieve the tunable impedance
Applicable Frequency	Above 30 GHz	Several GHz	Ours: The approach is useful at frequency above 30GHz where FET switch's character becomes non-ideal U.S. Patent 5786737: The approach is only applicable at frequency below 10GHz where the character of the FET switch is nearly ideal
Approach	Using ITN to replace the conventional resonant FET in MMW frequency	Using a number of switches to control a tunable matching circuit (variable stub length) to achieve arbitrary impedance electronically in microwave frequency range	Ours: The ITN is used to transform switch's impedance to the desired values in order to achieve nearly ideal character U.S. Patent 5786737: The FET switch is used to switch in and out a portion of the matching circuitry in order to achieve tunable impedance of the entire matching circuit
Design Concept	The ITN to transform the non-ideal switch on- and off-state impedances to near open and near short circuited	The matching circuit used to make input impedance of the cascaded blocks to be matched	Ours: the nonideal open circuit is transformed to near short circuit while the nonideal short circuit is transformed to near open U.S. Patent 5786737: to make the input impedances of the FET 5 (Fig. 1) and the impedance matching circuit to be conjugately matched
Circuit Configuration	The passive FET with ITN must be shunted with the main signal transmission line	The matching circuit must consist of an array of FETs and transmission lines	

Because the Goto patent does not disclose all elements recited in claims 1 and 2, withdrawal of the rejection under 35 USC §102(b) is respectfully requested.

Having thus overcome each of the rejections made in the Official Action, withdrawal of the rejections and expedited passage of the application to issue is requested.

Respectfully submitted,

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